

# HMC310MS8G

## BLUETOOTH & 2.4 GHz WLAN GaAs MMIC TRANSCEIVER

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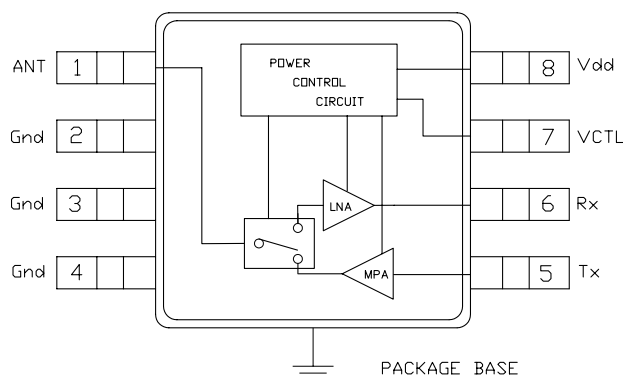
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### Typical Applications

Transmit & Receive  
Switch for 2.4 GHz Applications:

- Bluetooth
- HomeRF
- WLAN Radios

### Functional Diagram



### Features

Tx Gain: 15 dB, Rx Gain: 13 dB  
Tx 1 dB Compression Point: 5 dBm  
Rx Noise Figure: 3 dB @ 2.4 GHz  
Single Positive Supply: +3V  
No External Matching Required

### General Description

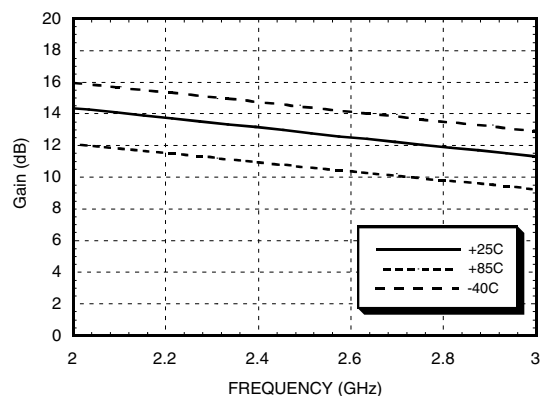
The HMC310MS8G is a multifunction RFIC that incorporates a power amplifier (PA) and low noise amplifier (LNA) with a transmit/receive switch. The RFIC offers 15 dB gain and +5 dBm P1dB in the transmit mode and 13 dB of gain with an overall noise figure of 3 dB when in receive mode. Transmit and receive performance levels have been selected to meet the BLUETOOTH Class 2 & 3 requirements when used in conjunction with 2.4 GHz ASICs such as National Semiconductor's LMX3162. This low current and low cost transceiver requires no external circuitry to operate the amplifier power down features, and is available in the industry standard MSOP8G package, which is 0.118" x 0.190" (3.0mm x 4.9mm).

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $V_{dd} = +3\text{V}$

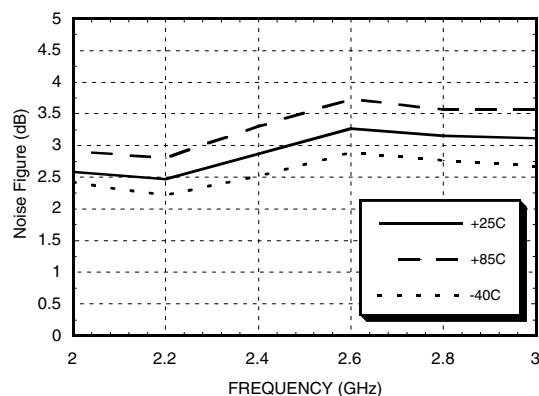
Parameter	Receive Mode			Transmit Mode			Units
	Min.	Rx Typ.	Max.	Min.	Tx Typ.	Max.	
Frequency Range	2.4 - 2.5			2.4 - 2.5			GHz
Gain	8	13	15	12	15	17	dB
Gain Variation over Temperature		0.03	0.04		0.03	0.04	dB/°C
Noise Figure		3.0	4.0				dB
Input Return Loss	4	6		4	7		dB
Output Return Loss	9	12		10	13		dB
Output Power for 1 dB Compression (P1dB)	-7	-4		1	5		dBm
Saturated Output Power (Psat)	-5	0		3	7		dBm
Output Third Order Intercept (IP3)	3	6		3	10		dBm
Supply Current (Idd)		12			24		mA

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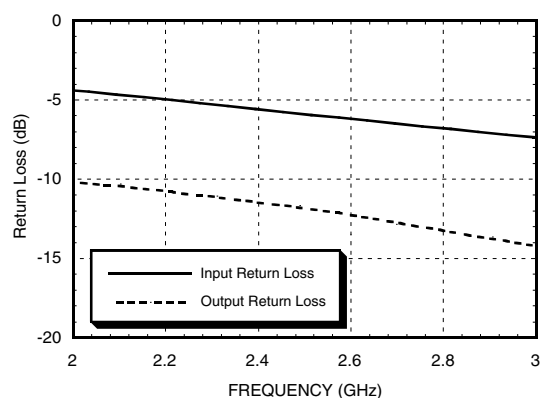
**Rx Gain**



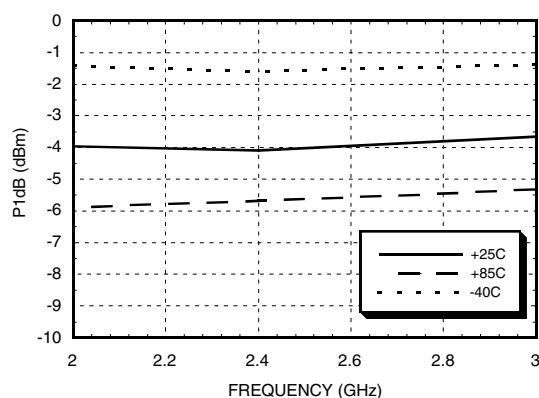
**Rx Noise Figure**



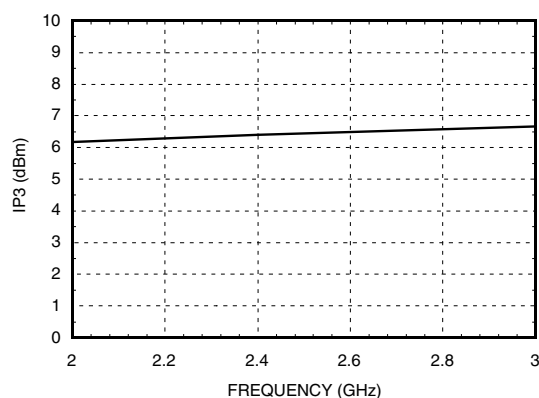
**Rx Return Loss**



**Rx 1dB Compression Point**



**Rx Output Third Order Intercept Point**

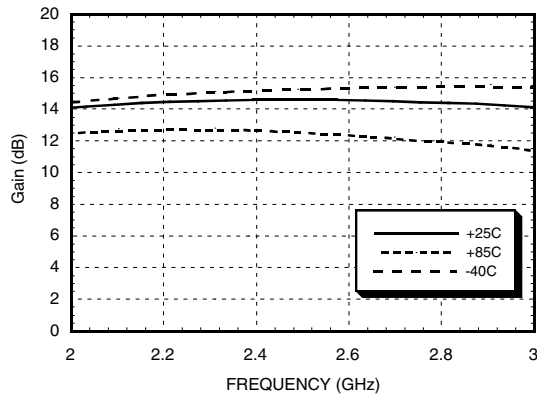


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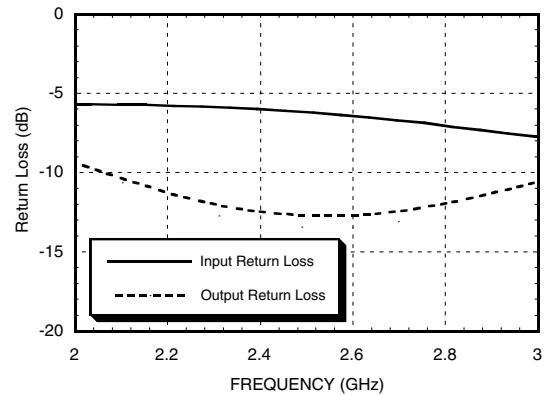
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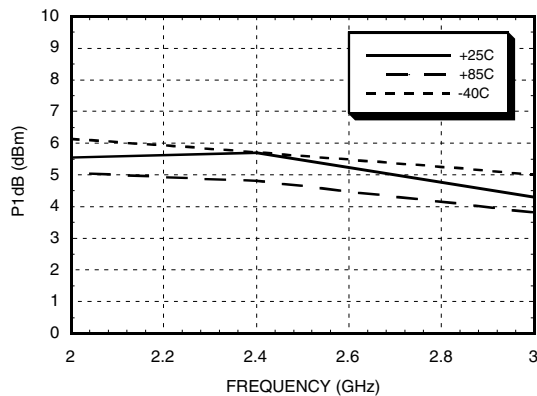
**Tx Gain**



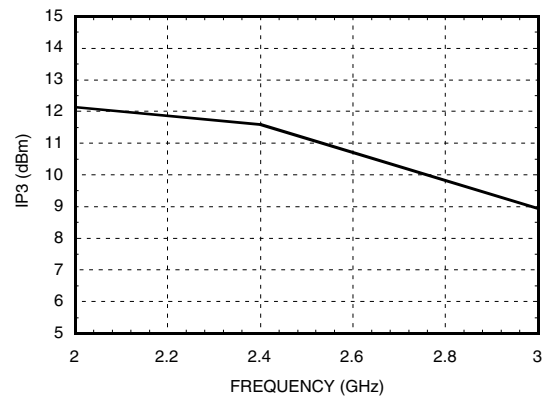
**Tx Return Loss**



**Tx 1dB Compression Point**



**Tx Output Third Order Intercept Point**



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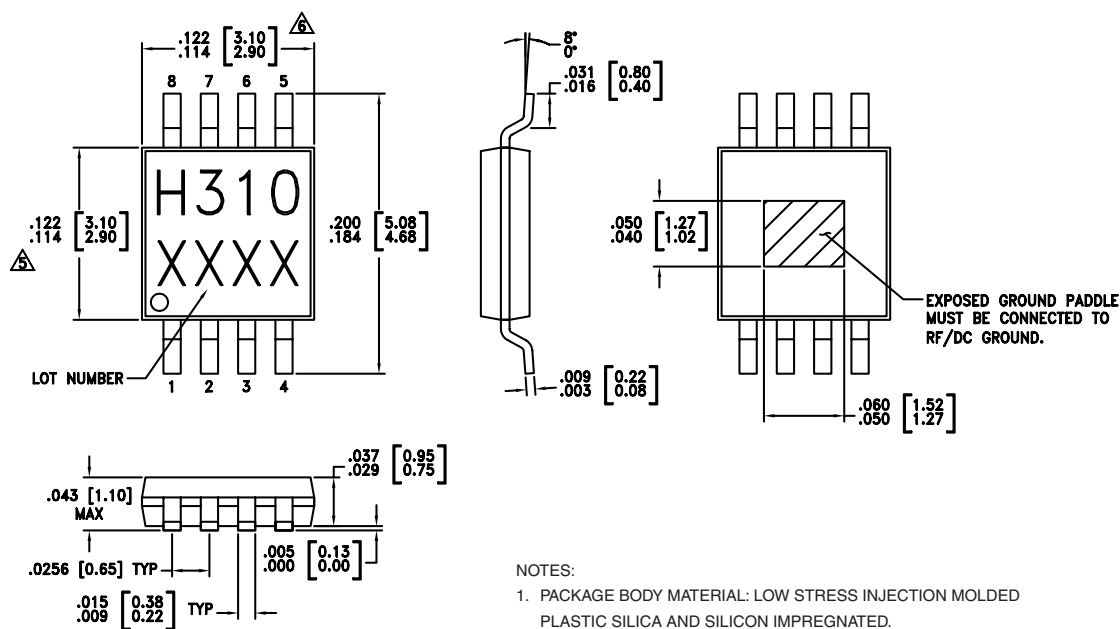
### Absolute Maximum Ratings

Drain Bias Voltage (Vdd)	+7.0 Vdc
Control Voltage Range (Vctl)	-0.2 to Vdd
RF Input Power (Vdd = +3.0 Vdc)	0 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 5 mW/°C above 85 °C)	0.325 W
Thermal Resistance (channel to ground paddle)	200 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

### Truth Table

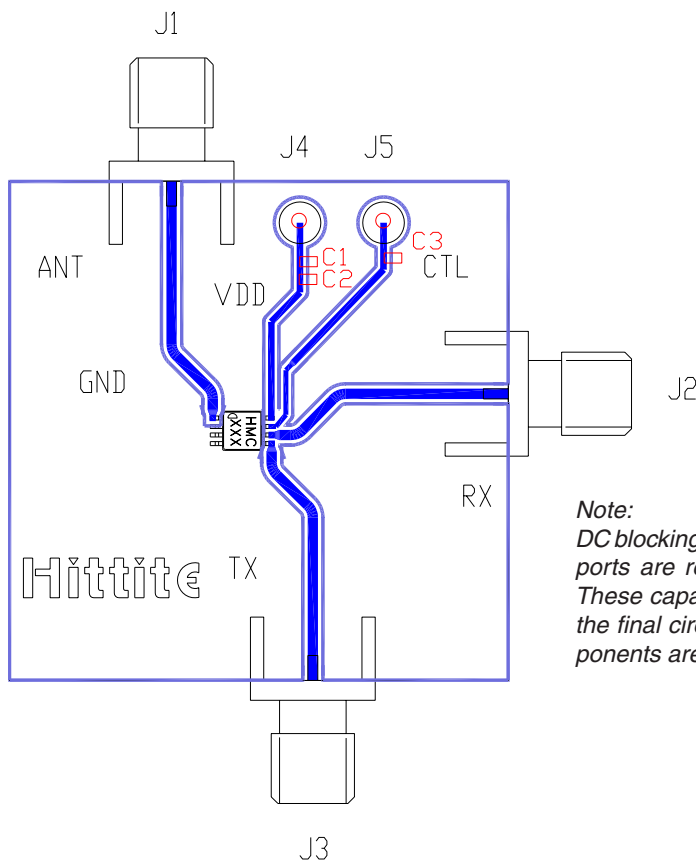
Tx Section Active	VCTL = Vdd
Rx Section Active	VCTL = 0V

### Outline Drawing



## BLUETOOTH & 2.4 GHz WLAN GaAs MMIC TRANSCEIVER

### Evaluation PCB



**Note:**  
DC blocking capacitors on the Tx and ANT ports are required to evaluate this part. These capacitors may not be required in the final circuit design if interfacing components are DC blocked.

### List of Material

Item	Description
J1, J2, J3	PC Mount SMA Connector
J4, J5	DC Pins
C1	.01 $\mu$ F Capacitor, 0603 Pkg.
C2, C3	100 pF Capacitor, 0603 Pkg.
U1	HMC310MS8G Transceiver
PCB*	Evaluation Board 1.5" x 1.55"
*Circuit Board Material: Roger 4350	

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads and backside ground slug should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.

## **BLUETOOTH & 2.4 GHz WLAN GaAs MMIC TRANSCEIVER**

### **Notes:**